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DOCUMENT-IDENTIFIER: US 6430502 B1

TITLE: Motor vehicle navigation system

Abstract Text (1):

The present invention relates to a motor vehicle navigation method and system (10). More specifically, this system comprises a central navigation computation unit (11) equipped with a memory (12) containing the topography of a predetermined zone, and a device (13) for locating the vehicle. The central unit (11) is associated with a voice-guidance device (15) and a screen (14) operating in a mode known as "normal guidance" mode, in which at least one direction pictogram is displayed on the screen to indicate the major maneuvers which have presently to be reproduced by the driver. The system according to the invention is characterized in that it comprises a control (16) designed to make the voice-guidance device (15) and/or the screen (14) operate in a temporarily enhanced guidance mode, in which at least one voice message and/or one direction pictogram reproduces the topography, as stored, of the area for which enhanced guidance has been requested, said enhanced guidance pictogram and/or the associated voice message being obtained by temporary modification of the filtering applied to the stored topographical data.

Brief Summary Text (3):

The present invention relates to a motor vehicle navigation method and system. More specifically, the system according to the invention is intended to assist with the travel of a vehicle through a predetermined geographical zone.

Brief Summary Text (4):

Navigation systems which allow a driver to navigate through a predetermined zone are already known. These systems display on a screen the major maneuvers that have to be performed in order to reach an objective set by the driver. In general, such systems operate as follows: the driver initially defines an objective to be reached, the system calculates and establishes a favored route for reaching it, and the system guides the driver step by step until this objective is reached.

Brief Summary Text (6):

Document DE 39 05 493 (BOSCH) describes a navigation system which displays a detailed road map on a screen on board the vehicle. However, this road map is difficult to consult quickly when a decision as to which direction to take is needed. According to that patent, the driver then has the option of requesting simplified guidance. This simplified guidance gives him a direction indication of the type shown on road signs, instead of the detailed road map. The purpose of such simplified guidance is to assist the driver in quickly making a decision. However, this guidance does not reflect the actual topography of the area because the road infrastructure is depicted symbolically. Thus, for example, if the driver needs to follow a main road which turns to the right, the simplified display will display "continue straight on", because what is needed is to continue following the main road. This may of course cause the driver to make a mistake or at the very least may trouble him. The simplified guidance mode according to that patent is unable to resolve such directional ambiguities.

Brief Summary Text (8):

Now, this scenario (a divergence between an indication given by the navigation system and the actual layout of the area as seen by the driver) occurs fairly often. This is because the mapping available commercially at the present time is often incomplete, or even incorrect, both in built-up areas and in rural areas. In built-up areas, the errors are mainly due to new roads which are not shown on the maps, or to modifications to the traffic plan. In rural areas, not all of the secondary roads are shown on the map and the risk of error is therefore great. The indications given by the screen may sometimes cause the driver to make a mistake. Thus, as was explained

earlier, when the main road turns to the right or to the left, the navigation system depicts the direction to be taken as a "straight on" indication. This is because, as far as the system is concerned, as it is still the main road that has to be followed, it is the "straight on" direction that has to be taken. If, through ill fortune, in the bend in the main road, there is a road leading "straight on" which is either not on the map or looks to be of the same order of importance even though it has been mapped with a lower order of importance, there is the risk that the driver will take the wrong direction. Such mapping errors and/or guidance anomalies are relatively frequent.

Brief Summary Text (12):

To this end, the present invention relates to a motor vehicle navigation system, of the type comprising: a central navigation computation unit equipped with a memory containing actual topographical data of a predetermined zone, and a device for locating the vehicle, the central unit being associated with a voice-guidance device and/or with a screen operating in a mode known as "normal guidance" mode, in which at least one direction pictogram is displayed on the screen to indicate the major maneuvers which have presently to be reproduced by the driver, said system being characterized in that it further comprises: a control designed to make the voice-guidance device and/or the screen operate in a temporarily enhanced guidance mode, in which at least one voice message and/or one direction pictogram reproduces the topography, as stored, of the area for which enhanced guidance has been requested, said enhanced guidance pictogram and/or the associated voice message being obtained by temporary modification of the filtering applied to the stored topographical data.

Brief Summary Text (13):

A system of this kind therefore allows the driver to have before him a simplified form of the map depicting the topography of the area on the screen. This map displays only pictograms reproducing the stored geographical configuration of the road infrastructure at the predetermined point. This actual geometric configuration may possibly be simplified slightly, but not interpreted. Thus a bend to the right by 15.5.degree. (for example) will not necessarily be depicted exactly by an arrow to the right inclined by 15.5.degree., but the bend to the right will be shown. In contrast, this same bend to the right will not be interpreted as having to be shown by a "straight on" arrow, under the pretext that it is the main road which is turning to the right.

Detailed Description Text (3):

This navigation system comprises, in the conventional way, a central computation unit 11 connected to a topographical memory 12 containing the topographical data of a predetermined area. The central computation unit 11 is also connected to a GPS (global positioning system) positioning device 13 associated, in the conventional way, with a number of positioning satellites 13a. The central computation unit 11 is also connected to a voice-synthesis device 15 designed to emit a voice message to the driver. A display screen 14, also connected to the central unit, presents on the screen at least one direction pictogram indicating the major maneuvers that have presently to be reproduced by the driver. According to the invention, this navigation system also comprises a control 16, depicted in FIG. 1 in the form of a simple push-button, which can be actuated by the driver and is placed near to him for this purpose.

Detailed Description Text (9):

The driver, arriving in sight of the intersection of the roads A and B, detects a guidance ambiguity. This being the case, he presses the push-button 16 to request enhanced guidance. The central computation unit 11 authorizes this enhanced guidance and presents, as shown in FIG. 2b, a pictogram indicating the actual topography of the area in which the vehicle is located, this pictogram presenting the stored direction to be followed. What really happens is that the switch to enhanced guidance mode has the effect of modifying the filtration of the information from the stored map and of allowing the information to be presented as stored, without interpreting it.

Detailed Description Text (11):

It will thus be noted that the enhanced guidance allows the stored directions to be followed to be announced and presented temporarily on the screen, according to the topography of the area as stored, and without concern as to whether or not a road is a main road. The driver, thus informed, can take the correct direction and continue his journey.

Detailed Description Text (12):

FIGS. 3a to 3c present a second scenario in which the driver may call for enhanced guidance in order to be correctly guided. FIG. 3a shows the stored topography of the area. The route C that the driver has to follow is shown by bold pictograms. In this particular instance the driver has,

starting from a position 1 (hatched triangle referenced 1) to follow a main road for a distance x and then go left for a distance y and, from a position 2, take path C on the right. However, between the distance x and the distance y he will cross an unmapped road B (or a road down which he is not permitted to turn), and when changing direction toward the right to take route C, he will arrive at a junction between a route A and a route C. This being the case, the normal guidance mode of the vehicle presents, as shown in FIG. 3b, an indication (voice and visual) indicating that he will need to turn right in a distance $x+y$.

Detailed Description Text (18):

The enhanced guidance mode according to the invention announces and displays, temporarily and in a simplified fashion the as-stored topography of the area in which the ambiguity has arisen. In fact, the enhanced guidance mode according to the invention modifies the filtering usually employed in normal guidance mode and presents the driver with all the necessary information at his disposal. It is the driver who then alone removes the ambiguity by recognizing the location and by using the enhanced guidance indications. These indications do, however, remain brief and do not require sustained analysis on the part of the driver in interpreting a map. Unlike that which has hitherto been the practice in motor vehicle navigation systems, it is therefore no longer a complete map which is presented to the driver in order to remove an ambiguity. The driver can thus more quickly and more easily analyze the maneuvers he has to reproduce, and incidentally in most cases, the voice-guidance message alone suffices. The driver therefore does not even have to consult the display screen. According to an alternative embodiment of the present invention, the navigation-aid device uses only a voice-guidance device 15.

Detailed Description Text (24):

It is the central computation unit 11 which, following actuation of the control 16 by the driver, compares the indications given by the normal guidance mode and the indications that the enhanced guidance mode could give. When there is a difference between the indication given by the normal guidance mode and the stored topography of the area according to the enhanced guidance mode, then the central computation unit 11 authorizes the switch to enhanced guidance mode. By contrast, as soon as the central computation unit 11 no longer perceives any difference between the normal guidance mode and the enhanced guidance mode, it causes the navigation system 14 to switch back to normal guidance mode. This switch to normal guidance mode may also be delayed for a certain length of time even if there are no differences between the normal guidance and the enhanced guidance modes.

CLAIMS:

1. A motor vehicle navigation system, comprising: a central navigation computation unit equipped with a memory storing topographical data representing an actual topography of a predetermined zone; a device for locating a vehicle in which said central navigation computation unit is disposed; a user interface device selected from the group consisting of a voice guidance device and a screen connected to said central navigation computation unit and operating in a "normal guidance" mode, wherein a direction pictogram is displayed on the screen to indicate major maneuvers to be reproduced by an operator of the vehicle; a control device for causing said user interface device to operate in a temporarily enhanced guidance mode, wherein said user interface device represents the topography, as stored in said memory, of an area for which enhanced guidance has been requested, obtained by temporary modifications of a filtering applied to the stored topographical data.

3. The navigation system according to claim 1, wherein said central computation unit is programmed, after an actuation of said control device, to authorize switching to said enhanced guidance mode if there is a difference between a direction indicated by the said normal guidance mode and the stored topography of the area.

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